CLAIMS

1. A method of preparing a sintering aid comprising:

mixing a first solution comprising a silicon ionic species with a second solution comprising an alkaline earth metal ionic species; and

reacting the silicon ionic species with the alkaline earth metal ionic species to form a silicate-based sintering aid.

2. The method of claim 1, wherein the silicate-based sintering aid comprises silicate-based particles.

3. The method of claim 2, wherein the silicate-based particles have an average particle size of less than about 500 nm.

4. The method of claim 3, wherein the silicate-based particles have an average particle size of less than about 100 nm.

5. The method of claim 4, wherein the silicate-based particles have an average particle size of between about 10 nm and about 50 nm.

6. The method of claim 2, wherein the silicate-based particles are substantially spherical.

7. The method of claim 2, further comprising mixing the silicate-based particles with barium titanate-based particles to form a dielectric composition.

8. The method of claim 7, further comprising sintering the dielectric mixture at a temperature of between about 1250 °C and about 1350 °C.

9. The method of claim 3, wherein the reaction is carried out under conditions effective to produce the silicate-based particles having an average particle size of less than about 500 nm.

10. The method of claim 1, wherein the silicate-based sintering aid comprises coatings on surfaces of a plurality of barium titanate-based particles.

11. The method of claim 10, further comprising hydrothermally producing the plurality of barium titanate-based particles.

12. The method of claim 10, wherein the barium titanate-based particles have an average particle size of less than about 500 nm.

13. The method of claim 10, further comprising sintering the coated barium titanate-based particles at a temperature of between about 1250 °C and about 1350 °C.

14. The method of claim 1, wherein the first solution comprises a silicate ion.

15. The method of claim 1, wherein the first solution comprises sodium silicate.

16. The method of claim 1, wherein the second solution comprises a solution from the group consisting of barium hydroxide and calcium hydroxide.

17. The method of claim 1, further comprising heating the mixture of the first solution and the second solution to a temperature of between about 60 °C and about 100 °C.

18. The method of claim 1, further comprising filtering, washing, and drying the silicate-based sintering aid.

19. The method of claim 1, wherein the silicate-based sintering aid comprises a multi-component silicate-based composition.

20. The method of claim 1, wherein the silicate-based sintering aid comprises $Ba_xCa_{1-x}SiO_3$.

21. A sintering aid comprising:

alkaline earth metal silicate-based particles having an average particle size of less than about 500 nm.

22. The sintering aid of claim 21, wherein the alkaline earth metal silicate-based particles have an average particle size of less than about 100 nm.

23. The sintering aid of claim 21, wherein the alkaline earth metal silicate-based particles have an average particle size of between about 10 nm and about 50 nm.

24. The sintering aid of claim 21, wherein the alkaline earth metal silicate-based particles are non-milled.

25. The sintering aid of claim 21, comprising multi-component alkaline earth metal silicate-based particles having an average particle size of less than about 500 nm.

26. The sintering aid of claim 25, wherein the multi-component alkaline earth metal silicate-based particles comprise $Ba_xCa_{1-x}SiO_3$.

27. The sintering aid of claim 26, wherein x is between about 0.4 and about 0.6.

28. The sintering aid of claim 21, wherein the alkaline earth metal silicate-based particles are substantially spherical.

29. The sintering aid of claim 21, further comprising barium titanate-based particles.

30. The sintering aid of claim 29, wherein the barium titanate-based particles have an average particle size of less than about 500 nm.

31. The sintering aid of claim 30, wherein the barium titanate-based particles have an average particle size of less than about 150 nm.

32. The composition of claim 29, wherein the barium titanate-based particles are substantially spherical.

33. A barium titanate-based particulate composition comprising:

barium titanate-based particles coated with an alkaline earth metal silicate-based sintering aid.

34. The composition of claim 33, wherein the barium titanate-based particles have an average particle size of less than about 500 nm.

35. The composition of claim 33, wherein the barium titanate-based particles have an average particle size of less than about 150 nm.

36. The composition of claim 33, wherein the barium titanate-based particles are substantially spherical.

37. The composition of claim 33, wherein the alkaline earth metal an alkaline earth metal from the group consisting of barium and calcium.

38. The composition of claim 33, wherein the coating comprises $Ba_xCa_{1-x}SiO_3$.

39. The composition of claim 34, wherein x is between about 0.4 and about 0.6.

40. The composition of claim 33, wherein the coating includes a plurality of chemically distinct layers.

41. A barium titanate-based composition comprising:

barium titanate-based particles; and

alkaline earth metal silicate-based particles having an average particle size of less than about 500 nm.

42. The barium titanate-based composition of claim 41, wherein the alkaline earth metal silicate-based particles have an average particle size of less than about 100 nm.

43. The barium titanate-based composition of claim 41, wherein the alkaline earth metal silicate-based particles have an average particle size of between about 10 nm and about 50 nm.

44. A multilayer ceramic capacitor comprising:

a dielectric layer comprising barium titanate-based particles coated with an alkaline earth metal silicate-based sintering aid.

45. A multilayer ceramic capacitor comprising:

a dielectric layer comprising barium titanate-based particles and alkaline earth metal silicate-based particles having an average particle size of less than about 500 nm.